NASA Glenn Research Center
AEROSPACE Frontiers
Volume 6 Issue 4 April 2004

JWST testing on horizon

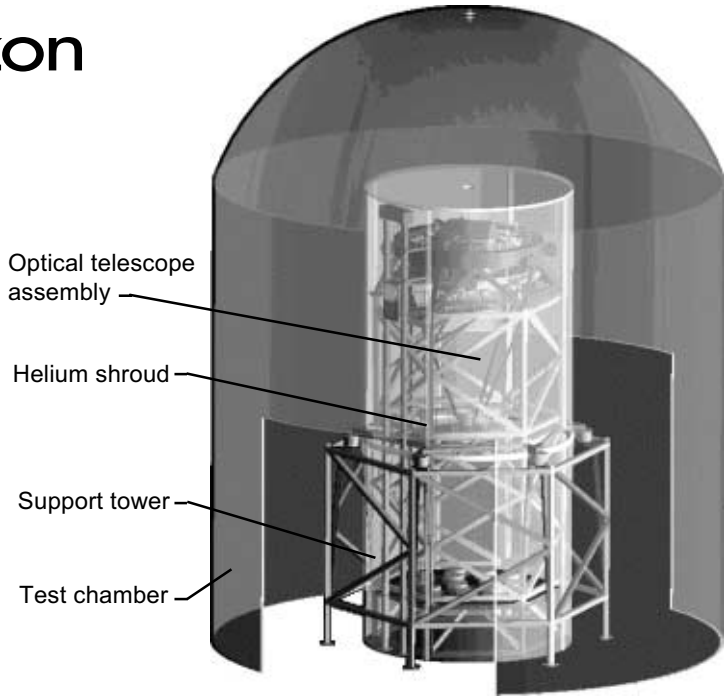
BY S. JENISE VERIS

Glenn engineers are gearing up the Space Power Facility (SPF) at Plum Brook to meet a challenging schedule of testing for the James Webb Space Telescope (JWST). It is a new kind of space telescope with a very large, infrared-optimized, primary mirror that will capture more light and resolve more distant objects than any other space-based telescope designed thus far.

Building on the success of Hubble, JWST is the first of the next generation of space telescopes designed to further our understanding of how the universe developed following the Big Bang. Understanding this process, through the formation of galaxies, stars, and planets, is a critical step in understanding the abundance of life on Earth and possibly elsewhere.

The telescope will be constructed using advanced, extremely lightweight mirrors that can be folded up to fit into the nose cone of a rocket. Once on orbit, the mirror will unfold with the help of computer-controlled actuators designed to work in extremely

Continued on page 8



Artist rendering for JWST inside the Space Power Facility.

Glenn's inerting technology aids aviation safety

NASA Glenn-developed inerting technology will play a key role in protecting civil aircraft against fuel tank fire explosion caused by an ignition source. In February, the Federal Aviation Administration (FAA) announced its intent to require center fuel tank inerting on all commercial transport aircraft. It is expected that airlines must retrofit existing aircraft in the U.S. commercial fleet, which now number more than 3000, within 7 years after the rule takes effect.

This technology, developed under NASA's Aviation Safety Program (ASP), is intended to reduce flammability and explosion risk within an airplane's heated center wing tank, which is located under the passenger cabin between the wings.

Dr. Clarence Chang of Glenn's Combustion Branch leads the team that is conducting studies to improve aircraft fuel tank safety. Reducing the oxygen concentration from 21 to 10 to 12 percent will prevent fuel tank ignition. Dr. Marty Rabinowitz, Combustion Branch, is working on the fuel reformulations to make the fuel harder to ignite to reduce the inerting requirement,

Continued on page 9

Inside

Arbuthnot named NASA Shared Services Center head

James L. Jennings, NASA associate deputy administrator for Institutions and Asset Management, announced the appointment of Richard Arbuthnot as executive director for the NASA Shared Services Center (NSSC).

Arbuthnot

In his new position, Arbuthnot will manage the business and technical shared services for NASA's financial management, human resources and procurement, and information technology offices. Arbuthnot will transition into his new role part time until he is permanently reassigned to the position this month.

Arbuthnot formerly served as director, Workforce and Diversity Management Office, at NASA Kennedy. He has significant experience in organizational development, workforce planning, and human resources. He has successfully introduced and implemented several strategic initiatives and applied innovative methods for enhancing organizational culture. ◆

Deputies for External Relations named

NASA Deputy Administrator Fred Gregory announced the appointments of Albert "Al" Condes as deputy assistant administrator and Joseph R. "Joe" Wood as deputy assistant administrator (Exploration), Office of External Relations.

Condes

Condes is responsible for NASA's international activities and coordination, particularly those related to Human Space Flight and Earth Science, in the U.S. Government interagency process. He has held several positions within the Office of External Relations and was a principal author of agreements with Russia, Europe, Japan, and Canada for their participation in the International Space Station Program.

Wood is responsible for development of NASA's international exploration activities, particularly those related to exploration beyond low Earth orbit, and coordination of NASA exploration policy formulation within the U.S. Government interagency process. His responsibilities extend to executive leadership and policy direction for External Relations involvement with exploration activities and related international cooperation by the NASA Offices of Space Science, Exploration Systems, and Aeronautics. He will coordinate with other executive agencies, such as the Department of Homeland Security. ◆

NASA TV prepares to go digital

The analog satellite signal used to broadcast feeds and other programming on NASA Television will soon become digital. Digital technology will enable NASA to concurrently broadcast multiple channels of broadcast-quality video, as well as interactive content and other information, all from one satellite transponder.

Your access to NASA TV content will be impacted by this upgrade, and your ability to see the programming provided by the Agency will be affected, unless you have the correct equipment to convert the new digital signal.

To keep you informed and to help you through this transition, NASA has set up an Internet site where you can join an e-mail list to receive periodic updates about the digital conversion. For information on how to sign up for news about the transition from analog to digital, visit http://www.tvsurvey.msfc.nasa.gov. ◆

NASA fills key space flight positions

Two veteran astronauts have been named to key space flight posts in Houston. Col. USMC Ret. Robert Cabana, who has flown on four space shuttle flights, has been named Johnson's Deputy Director. Capt. USN Kenneth Bowersox, who served as commander of Expedition 6 on the International Space Station, replaces Cabana as director of Flight Crew Operations.

Cabana

Cabana takes over from Brock "Randy" Stone, who is retiring after a remarkable 36-year NASA career that included work on the Apollo lunar missions, Skylab, the space shuttle, and the International Space Station. Prior to his new position, Cabana served in a number of management positions supporting the Astronaut Office and the Space Station Program, as well as serving as NASA liaison to the Russian Space Agency.

Bowersox

Since joining NASA in 1987, Bowersox has flown on five space flight missions, including two to the Hubble Space Telescope and spent more than 5 months onboard the space station. He will manage NASA's astronaut corps and aircraft operations. ◆

NASA leads Space Technology Hall of Fame inductees

Three out of four honorees inducted into the Space Technology Hall of Fame this year were NASA space technologies, ranging from a medical technology that enables thousands of people to see better, to software able to determine satellite orbits with pinpoint accuracy. The fourth technology inductee was the work of the U.S. Air Force Research Laboratory (AFRL).

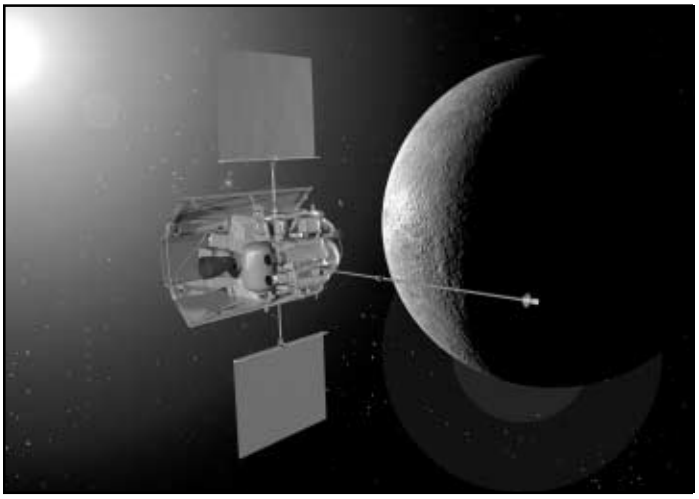
The technologies and their creators were honored at the 16th Space Technology Hall of Fame Dinner, cosponsored by The Boeing Company during the 20th National Space Symposium, March 29 to April 1. NASA Administrator Sean O'Keefe congratulated the Space Foundation and remarked that the 2004 honorees are a shining example of how the exploration of space returns incredible and sometimes unexpected benefits for all of us on Earth.

The Space Foundation, in cooperation with NASA, established the Space Technology Hall of Fame in 1988 to honor innovators who transform space technology into commercial products, to increase public awareness of the benefits of space technology, and to encourage further innovation.

The four products incorporating space-based technologies inducted this year are LADARVision 4000: Laser-Assisted In Situ Keratomileusis, or LASIK, the most widely performed eye surgery in use today. LASIK is based on technology used to assist spacecraft in delicate docking maneuvers. It uses a laser and eye-tracking device to reshape the cornea. The MedStar Medical/Health Monitoring System: A Cybernet monitoring system that evolved from research on a miniature device to remotely collect and analyze astronaut health data on the space station. Precision Global Positioning System: A software system originally developed to determine satellite orbits with pinpoint accuracy and adapted to improve air travel safety for millions of travelers. Multi-Junction (MJ) Space Solar Cells: AFRL-sponsored research to produce high-efficiency multi-junction space solar cells, which has resulted in reduced space mission lifecycle costs, reduced customer costs for telecommunication, improved weather forecasting, and many other services crucial to our daily lives on Earth. ◆

Special delivery to Mercury

Glenn engineers and technicians had a critical role in the delivery of *MESSENGER* (**ME**rcury **S**urface, **S**pace **EN**vironment, **GE**ochemistry, and **R**anging) spacecraft, scheduled to launch May 11, 2004, on its way to explore the planet Mercury by 2007.



Artist concept of the MESSENGER in orbit with the Sun.

Working 10 consecutive days beginning September 11, 2001 through September 21, the 15-person team performed the most difficult phase of the *MESSENGER's* component testing—evaluating prototype solar array modules from four vendors. They had to simulate the same conditions on four consecutive tests that required all aspects of Glenn's Tank 6 Solar Simulator, vacuum, and test instrumentation to operate in a repeatable manner without error or failure. (See *AeroSpace Frontiers*, November 2001)

The *MESSENGER* is a NASA Discovery mission designed to gather information with its miniaturized instruments about the thin atmosphere, polar caps, and the origin, density, composition, and history of volcanoes on the planet Mercury. It was designed and built by the Applied Physics Laboratory at Johns Hopkins University, Baltimore, MD. ◆

NASA, Honeywell launch "rock" tour

NASA and Honeywell recently launched a dynamic rock-and-roll education program at Fees Middle School in Tempe, AZ. The program, called "FMA Live! Where Science Rocks," enables students to experience science in a way never before seen or heard. The program is named after Newton's Second Law: **F**orce equals **M**ass times **A**cceleration.

"FMA Live! Where Science Rocks" uses a diverse troupe of live actors, music, videos, and demonstrations to teach Sir Isaac Newton's Three Laws of Motion and the Universal Law of Gravity in a powerful and memorable way.

The program is the focus of a new national partnership between NASA and Honeywell, a diversified technology and manufacturing leader, with the goal of engaging middle-school students in the wonders of science, technology, and math.

Hometown Solutions, Honeywell's community-relations initiative, will underwrite an 18-week tour in 2004 for "FMA Live!" visiting 45 middle schools in 25 markets, including Phoenix, Chicago, Minneapolis, Seattle, Detroit, and Washington. The goal is to reach an estimated 125,000 students in more than 150 middle schools in 100 communities over the next 3 years.

For information about this and other NASA education programs, see http://education.nasa.gov. ◆

Combined Federal Campaign success

Thanks to Glenn's caring employees, the 2003 Combined Federal Campaign (CFC) was a great success! Generous employees contributed $400,400 to help those in need, exceeding this year's $362,000 goal. In recognition of this outstanding achievement, Glenn received several awards during the 2003 Northeast Ohio CFC Awards Ceremony held on January 22. Glenn's 2003 CFC Chairperson Robert G. Everett (7790) presented the highly coveted "Chairperson's Award" (Bronze Eagle, pictured) to Center Director Dr. Julian Earls at the March 8 Director's Leadership Team meeting. The award recognizes Glenn as the Super Large Agency category (500-plus employees) conducting the best overall campaign. Glenn also received the "Director's Award" certificate for conducting a model campaign and the "100% of Goal Award" certificate for exceeding our challenging 2003 CFC goal.

C-2004-385 Photo by Marvin Smith

Photo by Robert Lasalvia

Dr. Earls addresses Kilmer Elementary School students as, left to right, astronaut Joan Higginbotham, Glenn's Educational Programs Chief Jo Ann Charleston, and Kilmer Principal Miguel Trujillo listen from the auditorium stage.

Teaming up for Explorer Schools

Center Director Dr. Julian Earls and astronaut Joan Higginbotham visited Joyce Kilmer Elementary School in Chicago, February 18, to share the Agency's new vision for space exploration with the next generation of explorers. Kilmer is one of five school teams in the six-state region served by Glenn to participate in NASA's Explorer Schools (NES) Program. The NES Program establishes a 3-year partnership with teams of teachers, education administrators, NASA personnel, and other educational partners to develop and implement strategic plans addressing local needs in mathematics, science, and technology. These plans outline ways to bring exciting opportunities to educators, students, and families through sustained professional development, inspiring student learning opportunities, integration of technology, and parental involvement. Read more about the program at http://explorerschools.nasa.gov.

C-2004-00347

Dick Shaltens (second, left), chief, Thermo-Mechanical Systems Branch, discussing nuclear power and propulsion. Left to right, Lee Mason (5490), Rear Adm. Craig Steidle, Jim Nehman, Leonard Dudzinski (7820), and Mike Lembeck.

Steidle and Code T team visit

Rear Admiral Craig Steidle, associate administrator for Exploration Systems (Code T), and his management staff found Glenn "ship-shape" during a series of briefings and tours the morning of February 25. The Code T team met Glenn personnel and received an overview of the technologies that Glenn and other NASA Center partners are developing that can be used to accomplish the Code T mission. Later that afternoon, Steidle accepted Director Earl's invitation to speak briefly before the Center's Reorganization Forum, where he introduced his staff: Jim Nehman, director, Development Programs (Code TD); Dr. Michael Lembeck, deputy director, Requirement Division (Code TR); and Dan Mabey, director, Business Operations Division (Code TB). Each member offered a brief description of his division's function to ensure Code T achieves its goals.

C-2004-00348 Photos by Marvin Smith

Jack Salzman, chief, Microgravity Division, briefs Center Director Julian Earls, Dan Mabey, Rear Admiral Craig Steidle, Leonard Dudzinski, and Associate Director Bob Fails.

Ask the Director

Q: With the weight of the Center and its future on your shoulders, where do you find the inspiration to remain so positive, impassioned, and dedicated?

A: I firmly believe in the people here at Glenn and their unwavering support for the tasks they are asked to perform. My optimism is a reflection from those here and at Headquarters with whom I interact. Administrator Sean O'Keefe, Deputy Administrator Fred Gregory, Associate Deputy Administrator Jim Jennings, and Associate Administrator for Aeronautics Vic Lebacqz all are very positive about the Agency, and that means Glenn as well. Their words to me are encouraging and supportive. In addition, the tremendous support evidenced by actions and expressions of the two Ohio senators, members of the Ohio delegation, Governor Taft and his staff, and the Ohio business, industry, and university communities cause me to be optimistic about the future of Glenn. Another basic philosophy that guides my actions is to concentrate my energy on solutions rather than the problem. This tends to provide me with a positive and proactive attitude. Finally, I know I am blessed to have been asked to represent the employees as Director of Glenn. I owe it to them to be positive, passionate, and dedicated.

Q: Can we assume that the organizational assignments posted on the NASA home page remain current until formal announcement of reorganization? If not, where can I find the current org. codes?

A: Not all management systems have been modified and codified to support the reorganization decision, yet. All existing assignments and codes are, therefore, still in place and are to be used until changes are formally announced through the Director's Leadership Team. Therefore, continue to use the old organization designations for distribution lists. Until we are able to revamp the mailing system, we will continue to use the existing one. Shortly, we are likely to announce a virtual system that initially will be a combination of the new alpha organization identifiers and old numeric e.g., (R/5000). We are building the new organization into the Integrated Financial Management System (personnel, accounting, etc.) and the new mailing system in time to "go live" for FY2005, October 1, 2004.

News Notes

LESA MEETING: LESA/IFPTE, Local 28, will hold its next monthly membership meeting on Wednesday, April 14, at noon in the Employee Center, room 101.

FINANCIAL EDUCATION WORKSHOP: Century Federal Credit Union, Financial Education Workshop Series, "Understanding Your Credit Score & Consolidating Your Debt" presented by Tony Coniglio, VP Lending, will be held Friday, April 16, from 11:30 a.m. to 12:30 p.m., bldg. 15, room 101. For more information or registration, contact Jeff Staats, jstaats@cenfedcu.org.

GOLFERS WANTED: NASA Sunshine Golf League, a 9-hole recreational league established in 1967, is accepting new members. Spouses and retirees are welcome. The season runs from April 22 to September 9. Play every Thursday at Riverside Golf Course, with tee times from 4 to 4:30 p.m. League dues are $30 and include three picnics and an awards banquet with door prizes. For more information, contact Donna Clements, president, 216–433–3566.

CENTAUR CELEBRATION: A special ceremony celebrating the release of a history book on Centaur titled *Taming Liquid Hydrogen: The Centaur Upper Stage Rocket 1958–2002* is scheduled for June. Current and former local civil service and contractor employees who worked on Centaur are invited. This new entry to the NASA History Series, coauthored locally by Dr. Virginia Dawson and Dr. Mark Bowles, has won the 2004 AIAA Historic Manuscript Award. The award will be presented at the ceremony and the authors will be available to autograph the book. To reserve a seat and/or a copy of the book, please contact Lynne Wiersma or Monica Palivoda (Lynne.M.Wiersma@nasa.gov or Monica.M.Palivoda@nasa.gov, or 216–433–2782). Details on this celebration and the possible reunion at the Kennedy Space Center for all Centaur Government and contract employees will follow in the next issue of *AeroSpace Frontiers*.

TOCTWD: Take Our Children To Work Day (TOCTWD) will be held on Thursday April 22. Children must be 9 to 15 years of age and either a child or grandchild of a NASA civil servant or contractor employee. The event will kickoff at 9:30 a.m. in the DEB Auditorium. Online registration can be found at the Women's Advisory Group Web site: http://www.grc.nasa.gov/WWW/AdvisoryGroups/WAG/. The list for both badges and tours will be available by April 8. You may register for up to two tours, or register without signing up for tours to receive a badge. Badge pickup will be from 11 a.m. to 1 p.m. on Monday, April 19, in the Main Cafeteria.

NGA RECRUITING: The NASA Golf Association (NGA) is an 18-hole traveling league that plays some of the finest public courses in Northeast Ohio. Team outings will be held Saturday mornings from May 1 to September 18. Dues are only $30 and include two steak cookouts and both team and individual prizes. If you are interested in joing, call Rob Button, 216–433–8010, or Mike Meyer, 216–433–7492, before April 23. Visit the NGA Web page at http://www.nasagolf. com.

AFGE MEETING: AFGE Local 2182 will hold its next monthly membership meeting on Wednesday, May 5, at 5 p.m. at Denny's Restaurant, 25912 Lorain Road, North Olmsted.

In Appreciation

I greatly appreciate the many kind expressions of friendship offered at several parties recognizing my recent retirement. It has been an honor to have had the opportunity to work with so many fine people. You will continue to be in my thoughts and prayers.

—Ron Everett

NASA Administrator spends a day in Greater Cleveland

C-2004-421

Sen. Voinovich addresses the media and distinguished guests. Pictured front row, left to right, Rep. Kucinich, Gov. Taft, O'Keefe, Dr. Earls, Mayor Elliot, and Lee Forsgren. Seated behind, John Lewis.

C-2004-407 Photos by Quentin Schwinn

Left to right, Bill Wessel is the recipient of NASA's Exceptional Service award presented by Administrator O'Keefe and Director Earls with GCP's Joe Roman and Vince Adamus, and Mayor Elliot applauding.

BY S. JENISE VERIS

I'm pretty discriminating about where I spend my St. Patrick's Day," said NASA Administrator Sean O'Keefe during his recent visit to Glenn and the Greater Cleveland area.

O'Keefe and members of the Headquarters staff traveled to Cleveland for a series of events that highlighted why the Greater Cleveland area merits the slogan, "Best Location in the Nation."

During an Editorial Board meeting held at *The Plain Dealer*, the Administrator announced the Agency's partnering efforts with naval designers to build nuclear spacecraft, an option under consideration to power NASA's Jupiter Icy Moons Orbiter. The unmanned mission is scheduled to launch in 2012 to explore Callisto, Ganymede, and Europa, Jupiter's planet-sized moons.

Upon his return to the Center, the Administrator joined Center Director Dr. Julian Earls to present Vernon "Bill" Wessel, director, Safety Assurance Technologies Directorate, with the Exceptional Service medal and certificate for leading the Government Mandatory Inspection Point Independent Assessment Team following the tragic loss of the *Columbia* STS–107 shuttle and crew.

C-2004-394

Deputy Director Rich Christiansen, far right, and Director Earls give Administrator O'Keefe a hardy St. Patrick's Day welcome and plaque. In background, John Hairston, External Programs Director.

A private briefing on Glenn's proposal for the NASA Shared Services Center preceded a drive-by of the proposed site and a reception at OAI. The Administrator was joined by Senator George Voinovich, Congressman Dennis Kucinich, Governor Bob Taft, Brook Park Mayor Mark Elliot, Greater Cleveland Partnership (GCP) President and CEO Joe Roman, and Ohio Aerospace Council Chairman and President of The University of Akron Dr. Luis Proenza, in a unified front of support from the federal, state, and local community to extol the benefits and advantages of the Glenn proposal.

After summarizing what he considered the highlights of the proposal, Senator Voinovich said, "In a nutshell . . . we (Brook Park, Greater Cleveland, and the State of Ohio) have everything you want."

Voinovich also accepted a plaque of appreciation from O'Keefe for his sponsorship of the NASA Workforce Flexibility Act to enhance the Agency's ability to recruit and retain exceptional talent for future missions. President Bush signed the Act into law February 24.

In the afternoon, the Administrator was transported by the AeroSpace Bus to join Astronaut Lt.Col. Michael Good for a visit as guests of honor to Lorain Middle School's NASA Explorer School (NES) assembly. O'Keefe shared a video on the Vision for Space Exploration and his hope that students of this generation would continue the journey to complete the missions initiated by his generation.

"So much of what we are engaged in now is about what we are going to be doing in the future. It's the kind of things that no one else is doing, so it's about how you

use new technologies and new opportunities to make space as accessible as airplane rides are today."

NES is a 3-year, math- and science-focused partnership with NASA designed to inspire middle school-aged students at a critical point in their development. Lorain is the only Ohio team out of 50 teams selected across the Nation and one of five schools selected from the six-state region served by Glenn.

To close out the exhilarating day of events, O'Keefe attended a reception in honor of Michael O'Kennedy, who is senior barrister and retired public servant to the Republic of Ireland. ◆

C-2004-454

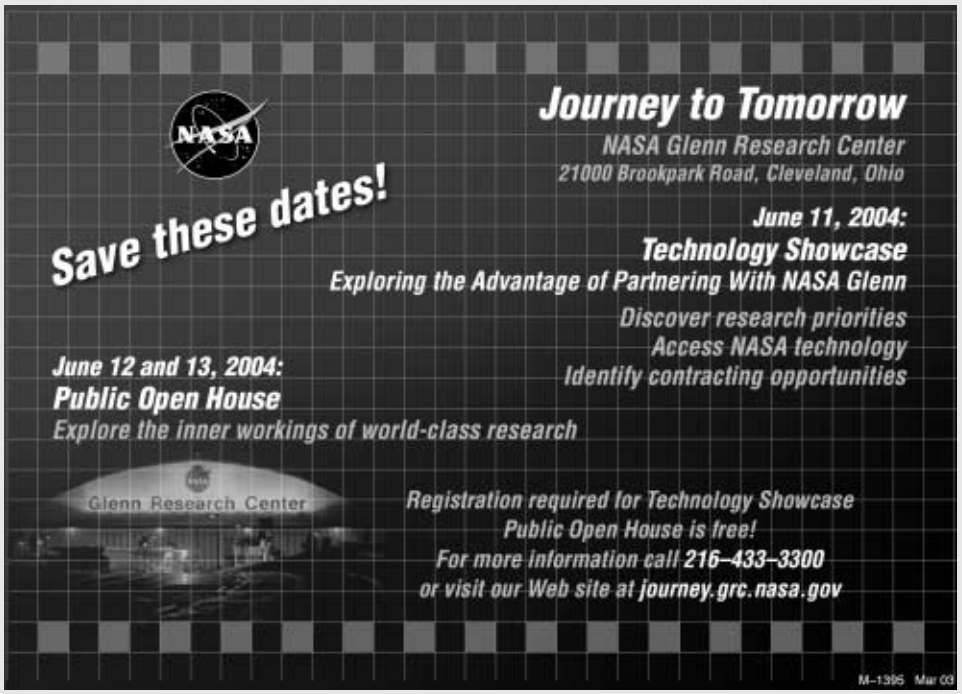
Astronaut Michael Good, from Parma, OH, shares how he achieved his dream with Lorain Middle School students.

C-2004-458

The Administrator and Astronaut Michael Good received mission-related drawings by Lorain Middle School students.

C-2004-464

Good, Lorain City Schools Board President Jeanine Donaldson, and O'Keefe during media briefing on the NES program.

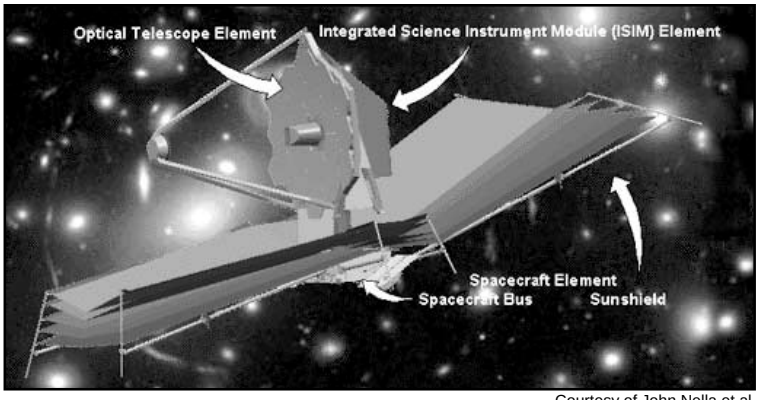


Journey to Tomorrow will be a whole weekend of exciting things to see and do. It's an event that promises to have something of interest for everyone. So, plan to attend and bring your family and friends. Clip and save this postcard as your reminder.

Space Telescope

Continued from page 1

cold space temperatures (~30 to 100 Kelvin). JWST will have an 18-segment, 6.5-meter primary mirror that can adjust in shape to obtain sharp, high-quality images. The telescope will maintain an orbit at the Earth-Sun Lagrange point (L2), approximately 1.5 million kilometers from Earth. Being the world's largest space environment simulation chamber, Glenn's SPF will provide the right size and environment to integrate, test, and align the space-based observatory.



JWST is a large, infrared-optimized space telescope. Courtesy of John Nella et al.

"The sheer size of our facility provides flexibility in the design of a test, and its extraordinary vibrational stability is crucial for enabling critical optical measurements for a structure of this size," said Richard Kunath, chief, Plum Brook Management Office. "A number of upgrades were also made over the past year to ensure a safe environment for testing JWST, including the replacement of 16 oil diffusion pumps (vacuum pumps that are used to achieve the high vacuum level in SPF) with 10 cryogenic pumps. These pumps provide the same function as the oil diffusion pumps, but without the use of silicon oil. The modification was made to ensure that there was no risk of contaminating the cryogenic optics of the telescope with silicon oil and damaging them."

Subsequent meetings with the JWST project office at Goddard Space Flight Center and the prime contractor Northrup-Grumman have revealed additional pretesting issues, such as cleaning and decontaminating the SPF vacuum chamber for the ultralow contamination levels that are needed to successfully accomplish this first-of-its-kind testing.

Frances Borato, Robert Puzak, Robin Brown, and Mark Woodling from the Engineering and Technical Services Directorate make up the small group of engineers who will identify the SPF upgrades needed to initiate testing; however, the Glenn JWST test team is still being formed.

"This project requires some very specialized expertise. We are in the process of putting together a Glenn JWST testing team to develop the designs and cost estimates of the clean rooms required for testing, as well as the modification of our cryogenic shrouds, which we will operate using helium in order to achieve the 37 K testing temperatures required," explained Jerry Carek, SPF manager. "Some of the things we need to do include installation of very large clean rooms—Class 10,000 to 100,000—and the design and construction of the world's largest helium- cooled shroud system. Specialized thermal systems must be used to get down to −410 °F to simulate the extreme cold conditions of space. Once we upgrade the SPF we will have created the Nation's largest cryogenic optics testing facility," he added.

Northrup-Grumman and Kodak have already done some initial design work on the JWST observatory test stand and the issues surrounding how to integrate the cryoshrouds into the design, as well as how to decontaminate the structure, are being investigated. Most of the facility buildup will take place between 2005 and 2006, with test hardware and test support equipment all arriving in 2006. Actual testing will begin in 2008 and continue through 2010. ◆

Let's do lunch: An informal link to Directors

Can We Talk? That's the name of a brand-new line of communication that is being installed at Glenn. What kind of line? A direct line, a tool for communication that puts Glenn employees face-to-face with Center Director Julian Earls and Deputy Director Rich Christiansen for an hour-long dialogue over boxed lunches, which will be provided.

Can We Talk? was the brainchild of NASA Administrator Sean O'Keefe, and team members who wanted to renew NASA's commitment to enhance the One NASA workplace culture and leverage the strength of the Agency's workforce diversity. The object is to tap various sources to address findings in both the Human Capital Survey and the Columbia Accident Investigation Board's report.

"Our goal is to invite ten employees, randomly selected each month, who will accept the opportunity to participate in this forum," said Office of Equal Opportunity Programs Chief Robert Romero. "By all accounts, the first one was a success. A wide range of topics were discussed with employees. They shared that meeting in the cafeteria made for a more relaxed atmosphere for questioning and the exchange of ideas."

Among the topics discussed in the Can We Talk? February 24 session were future use of vacant Aerospace Tech Park buildings; Glenn's potential role in launch support for the Crew Launch Vehicle, a project that recalls the Centaur Program years at this Center; and Glenn's ranking in recent human capital surveys.

Minutes from every session will be posted on Today@Glenn and the Director's page on Web Interanet@Glenn. ◆

Photo by Jisabelle Garcia

The February 24 session with Earls and Christiansen.

Glenn Celebrates Earth Week— April 15 to 22

Glenn's Earth Week Committee invites everyone to visit a variety of displays and events planned for onsite and as outreach to nearby communities during the 11th Annual Earth Week celebration from April 15 to 22.

The AeroSpace Bus will jumpstart Earth Week festivities with a visit to Lewis Little Folks on April 6 to augment their week-long nature and environmental curriculum, April 5 to 9. A Metroparks naturalist will make a follow up visit in May to teach the children how to become better caretakers of the environment. Books, posters, and videotapes will also be provided.

Earth Week schedule of events

April 15–16: Several environmental displays will be available in Building 15, first floor and outside in small parking lot. The popular Earth Week T-shirt featuring another unique logo imprinted on organic Texas cotton with organic ink will be on sale in the Main Cafeteria.

April 18: Earthfest at the Zoo. The Committee will staff a NASA display featuring energy-saving devices such as an E-Bike (a battery-powered bike that charges when you pedal) and flywheels (an energy-storage alternative to lead batteries), as well as models of the Mars rover and the space shuttle.

April 19–22: Food for thought will be part of the fare available in the Main Cafeteria. Employees can visit displays on alternative power sources and Glenn's environmental programs, including recycling, GO-Bike, Adopt-A-Highway, and energy conservation. A "Buck for a Buckeye" will get you an Ohio buckeye tree. And, if you want to get rid of any old sneakers stacking up in your closet or garage, the Committee is collecting them for Nike™, who plans to reincarnate them as indoor basketball courts or field turf.

April 21: The AeroSpace Bus will be on display as part of Youngstown University Earth Day Awareness event at Kilcawley Center.

To view updates to the Earth Week festivities, learn more about Glenn's Earth Day Committee, and for other environmental links, visit http://earthday.grc.nasa.gov/calendar_page04.htm. ◆

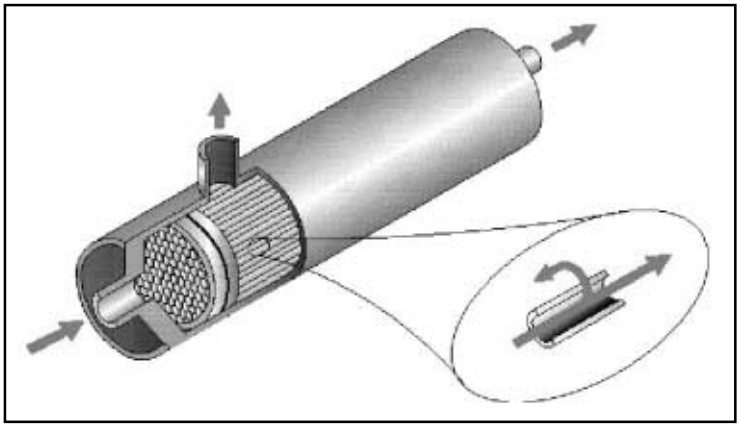
Aviation safety kit

Continued from page 1

and Dr. Gary Hunter, Sensors and Electronics Technology Branch, rounds out the team with research on sensors that detect the levels of gases in a tank.

"We know that in order to initiate combustion, three ingredients are needed: oxygen, fuel vapor, and an ignition source," said Chang. "We can't remove the fuel from the tank and we've already removed just about all the known ignition sources. Since we can't remove the ignition sources we don't know about, decreasing the oxygen level is currently the easiest way to avoid fuel tank explosion."

The explosion of TWA 800 over Long Island Sound in 1996, killing all 230 people aboard, spurred NASA's research on a workable solution for neutralizing fuel tank potential for fire and explosion. A number of other initially unexplainable explosions later determined to be fuel tank explosions, led to National Transportation Safety Board recommendations on the need for an On Board Inert Gas Generation System (OBIGGS).



The safety kit recently demonstrated on Johnson's Boeing 747 is composed of air separation modules about 4-foot by 8-inches diameter. Very fine hair-like fiber tubes inside enable the oxygen to leak through as nitrogen is forced through to create nitrogen-enriched air (NEA) with 1 -7 percent oxygen. Normal air is 20.9 percent oxygen.

The events of September 11, 2001, however, were the catalyst for the FAA and NASA's effort to apply this technology, previously limited to use in military aircraft, to develop a more affordable safety device for commercial aircraft.

"The military already uses nitrogen or halon to inert their tanks. They began testing this concept near the end of WWII," said Chang. "In later years, very expensive and large safety devices were installed on combat planes. We're working on something smaller and more affordable, but equally efficient for commercial planes, although the threat levels are very different."

Researchers have been working since September 2003 under four NASA contracts to determine the feasibility of the next-generation hardware, with Creare Engineering, Inc., of Hanover, NH; Essex Cryogenics, Inc., of St. Louis, MO; Honeywell Environmental Controls Systems of Torrance, CA; and Valcor Engineering of Springfield, NJ. Valcor and Honeywell were retained to develop the high-temperature air separation modules (ASM) for the next-generation OBIGGS.

The next step is to determine that the hardware works onboard an airliner. Hardware and technology demonstrations of the current-generation ASM OBIGGS developed by the FAA were conducted in October 2003, and more demonstrations are planned for mid-May of this year. Arrangements have been made with the NASA Johnson Space Center to fly the inerting hardware on the Boeing 747 used for transporting the space shuttle.

S. Jenise Veris and Katherine Martin collaborated on this article. ◆

People

Dr. Roshanak Hakimzadeh and **Barbara Esker** are the recipients of the 12th Annual Glenn Federal Women's Program Awards recently presented during Women's History Month in March. Hakimzadeh, who serves as chief of the Photovoltaic and Space Effects Branch, won in the "Supervisory" category "for an exceptional job in outreach to young people, especially young women, and in working with her own branch members to further their careers." Hakimzadeh was nominated by her division chief, Dr. Valerie Lyons, Power and On-Board Propulsion Technologies Division. Esker, who served as integration manager for the Aeropropulsion Research Program Office, was nominated in the "Non-Supervisory" category by Aeropropulsion Research Director Dr. Gary Seng, who cited many examples of her mentorship and "an exceptional ability to help others define their goals." The Glenn Federal Women's Program Awards are administered as a joint effort between the Glenn Federal Women's Program and the Women's Advisory Group. Nominees are judged for leadership roles, goal setting, self-motivation, and membership in organizations.

Dr. Hakimzadeh

Esker

Aylward

Erin Aylward, a 2003 NASA Undergraduate Student Research Program intern from Harvard University, has earned the honor to participate in the Posters on the Hill Symposium, a prestigious undergraduate research symposium in Washington, DC, to remind U.S. Senators and Congressional Representatives of the importance of funding research. Aylward submitted a poster describing research on an adaptive controller for a degraded turbofan engine that she performed under the guidance of Jonathan Litt, her mentor in the Controls and Dynamics Technology Branch. Her poster is one of 60 from across the Nation to be presented at the symposium this month.

Bryan Palaszewski, Combustion Branch, was selected to receive an American Institute of Aeronautics and Aerospace (AIAA) Sustained Service Award. He was lauded for "extensive and energetic support of AIAA with the organization of national professional development courses, national technical committee leadership, and local New York Student Section and Northern Ohio Section activities and leadership." The award will be presented to Palaszewski in July at the AIAA Joint Propulsion Conference in Fort Lauderdale, FL.

Palaszewski

Smith

Chelsea Smith, an electronics engineer in the Avionics, Power, and Communications Branch, was one of five 2004 Nsoroma Award winners honored at a special luncheon sponsored by the Cleveland Chapter of the National Technical Association. She earned the Nsoroma Princess award presented to young women (18 to 25 years old) who have an impact in the community and in their field. Smith was cited for her tutoring, mentoring, and volunteering over her career, and more recently, teamwork that merited a second-place medal in a contest sponsored by the National American Society for Mechanical Engineers. Nsoroma is a unique program that recognizes local women of color for their scientific and technological accomplishments, fortitude, and community involvement.

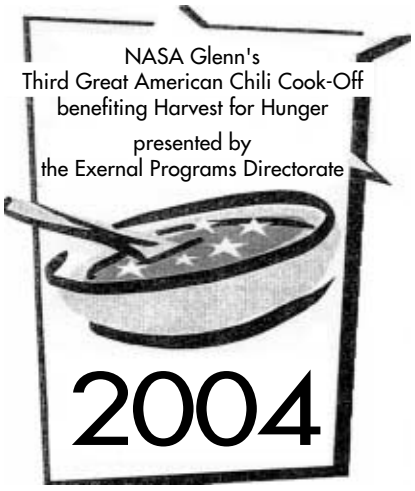
The American Ceramic Society selected Glenn's **Dr. Jonathan Salem**, Life Prediction Branch, as a recipient of the 2004 Richard M. Fulrath Award. Established in 1978, the Fulrath Award recognizes outstanding academic and industrial ceramic engineers and scientists who are 45 years of age or younger. The award also promotes technical friendships between Japanese and American colleagues and encourages understanding between the diverse cultures surrounding the Pacific Rim.

Dr. Salem

Exchange Corner

• Advance tickets for the I–X Indoor Amusement Park at $13.00 per ticket are available at the Exchange Store. The amusement park dates are April 8 through May 2.

• The Harvest for Hunger Third Annual Great American Chili Cook-Off will be Thursday, April 29, from 11 a.m. to 1:30 p.m. in the upper section of the Main Cafeteria. Come out to enjoy the unique chili recipes of Glenn coworkers and donate to a worthy cause. Local vendors will provide prizes for drawings. For more details, go to http://cfo.grc.nasa.gov/cfo/exch/cal/new.asp?xmonth=4&xyear=2004.



In Memory

Bogart

Donald Bogart, 81, who retired with 38 years of NASA service in 1981, recently died. Bogart headed the Nuclear Physics Branch, where he managed a team of scientists who were developing a nuclear rocket for manned spaceflight to Mars several decades ago. Although the research on such a rocket was determined unfeasible during his tenure, advancements in nuclear propulsion technology have led to its consideration for future missions. Bogart is remembered for adapting himself to different projects throughout his time at the Center, including aeronautics and solar energy. In fact, he returned briefly as a contractor in 1994 to share calculations from his unpublished research that he hoped might answer questions about work being performed at the time by Lewis scientists. Bogart was the founder of Beth Israel-West Temple and a true humanitarian who enjoyed a lot of projects outside of his profession, including volunteering and gardening, both of which bore fruit for his family and neighbors.

AeroSpace Frontiers is an official publication of Glenn Research Center, National Aeronautics and Space Administration. It is published the first Friday of each month by the Community and Media Relations Office in the interest of the Glenn workforce, retirees, Government officials, business leaders, and the general public. Its circulation is approximately 6700.

Editor.....Doreen B. Zudell
InDyne, Inc.
Assistant Editor.....S. Denise Veris
InDyne, Inc.
Managing Editor.....Lori J. Rachul

DEADLINES: News items and brief announcements for publication in the May issue must be received by noon, April 16. The deadline for the June issue is noon May 13. Submit contributions to the editor via e-mail, doreen.zudell@grc.nasa.gov, fax 216–433–8143, phone 216–433–5317 or 216–433–2888, or MS 3–11. Ideas for news stories are welcome but will be published as space allows. View us online at http://AeroSpaceFrontiers.grc.nasa.gov.

WINNER 2003 APEX® AWARDS FOR PUBLICATION EXCELLENCE

Behind the Badge

a closer look at our colleagues

Chip Redding

Far right, Chip Redding, with the FBM racing team.

Job Assignment: Mechanical engineering technician in the Mechanical Design Branch, Engineering Development Division

Time at NASA: 22 years

Describe your family: I come from a large family of 10 siblings. I have three older sisters and six younger brothers. One of my brothers, Adam, works here at Glenn in the Engineering Development Division. We all grew up on the east side in a huge old house in Cleveland Heights where my mother still lives. I have two sons of my own that I raised after my divorce. They have both grown and moved out. I now have a 2-year-old grandson, Kristopher, who I spend a lot of time with. He is my best buddy.

Favorite quote(s): "Anyone who has never made a mistake has never tried anything new."— Albert Einstein; and, when asked by a frustrated assistant about having failed to find a solution to making an electric light bulb: "I have not failed 700 times. I have not failed once. I have succeeded in proving that those 700 ways will not work. When I have eliminated the ways that will not work, I will find the way that will work."—Thomas Edison

Social/professional activities at Glenn: It has been very rewarding to work with the U.S. FIRST (For Inspiration and Recognition of Science and Technology) High School Robotics Competition since the beginning of involvement 10 years ago. I continue to support the competition by working the Buckeye Regional. I am also involved with the Glenn Adopt-A-Highway.

Hobbies/interests outside of NASA: I am a member of a professional Nitro-Harley Drag Racing Team. The team's name, FBM Racing, is from the founder's nickname; Fuel Bike Mike. The new owner, Chris Streeter, is an old friend of mine. He has been into racing for many years and was Mike's old crew chief. I helped him with his program several times over the years and wrote a Web site for the team: FBMRacing.com. Chris asked me to join his team last year. The team rides around in an old 1971 Chevy school bus that once belonged to the Medina school district. We have a trailer packed full of tools and equipment and the race bike. This is not your run-of-the-mill custom motorcycle! It has a nitro-methane-injected 150-cu-in. motor that produces 700 horsepower with a 13-in.-wide tire on the back. It can get down the quarter-mile drag strip in less than 7 seconds at speeds up to 200 mph. We travel all over the United States competing at the National Hot Rod Association and the International Hot Rod Association race tracks for the All Harley Drag Racing Association sanctioned races. Last year we took the National Championship in the Pro-Fuel Class. We have just started a new season and went to the finals in our first race this year. Last year we went to the final rounds in nine consecutive races.

Glenn engineers showcase quilting skills

BY DOREEN ZUDELL

While Dr. Judy Auping and Dr. Mary Ann Meador are known for their work as chemical engineers at Glenn's Materials Division, they recently earned recognition for another talent: quilting. The team designed a quilt for the Cleveland Metroparks in recognition of Ohio's Bicentennial.

Auping and Meador, who have enjoyed crafting quilts and wall hangings for friends and relatives for more than15 years, were intrigued by the challenge of designing a quilt that would carry such importance to the Metroparks and gain the status of public art among the general public.

"I was interested in submitting a design but didn't want to take on a project of this magnitude on my own, "Meador said. "So, Judy and I decided to work as a team."

Over several months, Auping and Meador produced 16 squares that depict animals, plants, and buildings found throughout the zoo and reservations. To tie it all together, they chose fabric in brown and green earth tones. The huge finished quilt measures 89- by 89-feet square.

Auping, left, and Meador with their quilt.

Part of the excitement of the project was that each quilt square pattern, which included all necessary materials, would be made available as kits to the public. The kits can be used to duplicate the squares in pillows, wall hangings, or as a complete quilt. The pattern kits were then released to the public and sold at Metroparks' nature centers and Abigayle's Quiltery store in Olmsted Falls.

Entitled "Emerald Reflections," the quilt made its debut last fall at the "Reflections of Nature" Quilt Show, which drew more than 4000 visitors. The quilt is on display at the Metroparks Rocky River Reservation.

"Although we choose to quilt because we love it, it is an added bonus to see how our design is so well received by the public," Auping said. "It proves that the ancient art of quilting is alive and well today." ◆

National Aeronautics and
Space Administration

John H. Glenn Research Center
Lewis Field
21000 Brookpark Road
Cleveland, Ohio 44135

Volume 6 Issue 4 April 2004

NASA Glenn Research Center
AeroSpace Frontiers